Abstract of the Disclosure

A radiometric system (10) typically used in semiconductor wafer processing has reduced optical losses, improved wavelength selectivity, improved signal to noise, and improved signal processing to achieve wafer temperature measurements from about 10°C to 4,000°C. A YAG rod collection optic (12) directly couples specimen radiation (14) to a filter (18) and photo detector (20). The filter determines which radiation wavelengths are measured, and optionally includes a hot/cold mirror surface (22) for reflecting undesired radiation wavelengths back to the specimen. The detector is formed from doped GaAlAs having a peaked response near 900 nm. A signal processor (28) converts the signal into a temperature reading.